

MELOIDOGYNE GRAMINIS, A ROOT-KNOT NEMATODE OF GRASS

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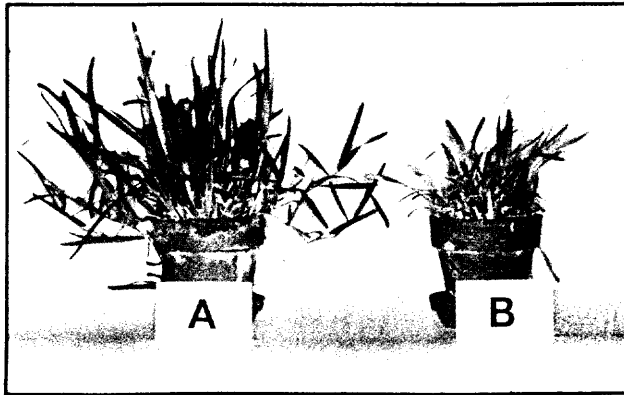


Fig. 1. St. Augustine grass.
A. Free of nematodes.
B. Infected with Meloidogyne graminis.

Meloidogyne graminis (Sledge and Golden 1964) Whitehead 1968 is a root-knot nematode of turfgrass in the southern United States (10). The damage caused by this nematode can be seen as large circular areas of dead or dying grass which may show chlorosis at the margins (3,7,8). The nematode was originally discovered by E. B. Sledge. He noticed that it was associated with declining patches of St. Augustine grass which became chlorotic and died (7,8). Root examinations revealed only minor elongated galling.

The nematode appeared to be an undescribed species, resembling root-knot (Meloidogyne spp.), but also possessing characteristics of the cyst nematode (Heterodera spp.). Van Weerdt referred to it in 1960, as possibly a new species of Meloidogyne and called it the "grass root-knot nematode" (9). In 1964, Sledge and Golden published a description, naming it Hypsoperine graminis, a new genus and species (8). It was later referred to as the "pseudo-root-knot nematode" because of its resemblance to the root-knot nematode (2,5). In 1968, Whitehead synonymized the genus Hypsoperine with Meloidogyne (10).

Meloidogyne graminis is distributed throughout the southern United States. It is a nematode of economic importance in Florida because of its ability to damage turf. A routine review of reference materials indicates that it has been recovered from Alabama, Arkansas, California, Florida, Georgia, Kansas, Maryland, Tennessee, Texas, and Virginia (3,11).

ROOT PENETRATION: Newly hatched 2nd stage larvae enter grass roots near the tip in the area of cell elongation (6). They migrate longitudinally through the root both intercellularly and intracellularly. Within 3 days, they usually cease migrating and come to rest with their heads and necks buried in the stelar region while the rest of their bodies remain embedded in the cortex (1,4,6). The sexes are usually distinguishable within 10 days after ingress, and egg production has been observed 26 days after ingress (6).

DISEASE SYMPTOMS: As the body of the female grows and swells, extensive damage to the root occurs. The cortex is split, the roots darken, and the stele becomes

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exposed, dry, and brittle (4,6). The cortex eventually sloughs. Gallling is most generally an elongated swelling of infected adventitious roots which appear as a cluster of 3 or 4 clubs at each node. Root elongation is halted and lateral root development is suppressed. Some root tips curve into a "J" (1,6). Top growth declines. It becomes chlorotic, stunted, and eventually dies (6,8).

HOSTS: The known host range appears to be restricted to grasses and includes Bermuda, St. Augustine, 'Pensacola' bahia, centipede, and zoysia. The following have been identified as hosts of *M. graminis* (1,4,5,7,11): *Agrostis stolonifera* L. var. *palustris* (Huds.) Farw. 'C-7', *Cynodon dactylon* (L.) Pers. 'Tifdwarf', *C. dactylon* 'Tifcote', *C. dactylon* 'Tiflawn' (T-57), *C. dactylon* 'Nomow', *C. dactylon* 'U-3', *C. dactylon* 'Ormond', *C. dactylon* X *C. transvaalensis* Davy 'Tiflawn', *C. dactylon* X *C. transvaalensis* 'Tifgreen', *C. transvaalensis*, *C. transvaalensis* 'Uganda', *Dactylis glomerata* L., *Digitaria sanguinalis* (L.) Scop., *Eremochloa ophiuroides* (Munro) Hack., *Festuca elatior* L. 'K-31', *Hordeum vulgare* L. 'Oderbrucker', *Paspalum notatum* Flugge, *Poa pratensis* L., *Sorghum bicolor* (L.) Moench 'RS610', *Stenotaphrum secundatum* (Walt.) O. Kuntze, *S. secundatum* 'Floratine', *Triticum aestivum* L. 'Pawnee', *Zea mays* L. 'K-1830', *Zoysia japonica* Steud., *Z. japonica* 'Meyer' (Z-52), *Z. japonica* X *Z. tenuifolia* Willd. ex Trin. 'Emerald'.

SURVEY AND DETECTION:

1. Look for large, roughly circular patches of dead or dying grass. Examine the roots for sparseness of growth, shortness of length, and elongated swellings.
2. Send approximately one pint of soil and roots to a nematology laboratory.

LITERATURE CITED:

1. Dickerson, O. J. 1966. Some observations on *Hypsoperine graminis* in Kansas. Plant Dis. Repr. 50:396-398.
2. Esser, R. P., and K. R. Langdon. 1965. Pseudo-root-knot nematode of turf. Pages 67-69 in: Fla. Dept. Agric. and Consumer Services, Div. Plant Ind. Twenty-fifth Biennial Report, July 1, 1962-June 30, 1964.
3. Grisham, M. P., J. L. Dale, and R. D. Riggs. 1974. *Meloidogyne graminis* and *Meloidogyne* spp. on zoysia; infection, reproduction, disease development, and control. Phytopathology 64:1485-1489.
4. Heald, C. M. 1969. Pathogenicity and histopathology of *Meloidogyne graminis* infecting 'Tifdwarf' bermudagrass roots. J. Nematol. 1:31-34.
5. Langdon, K. R. 1967. Pseudo-root-knot nematode host testing. Page 95 in: Fla. Dept. Agric. and Consumer Services, Div. Plant Ind. Twenty-sixth Biennial Report, July 1, 1964-June 30, 1966.
6. Maur, K. M. 1968. Pathogenicity and histopathology of *Hypsoperine graminis* on St. Augustinegrass and Bermudagrass. Univ. of Fla. 76 pp. Dissertation.
7. Sledge, E. B. 1962. Preliminary report on a *Meloidogyne* sp. parasite of grass in Florida. Plant Dis. Repr. 46:52-54.
8. ———, and A. M. Golden. 1964. *Hypsoperine graminis* (Nematoda: Heteroderidae), a new genus and species of plant parasitic nematode. Proc. Helminth. Soc. Wash. 31:83-88.
9. Van Weerdt, L. G., W. Birchfield, and R. P. Esser. 1960. Observations on some subtropical plant parasitic nematodes in Florida. Proc. Soil and Crop Sci. Soc. Fla. 19:443-451.
10. Whitehead, A. G. 1968. Taxonomy of *Meloidogyne* (Nematoda: Heteroderidae) with descriptions of four new species. Trans. Zool. Soc. Lond. 3(3):263-401.
11. Williams, A. S., and C. W. Laughlin. 1968. Occurrence of *Hypsoperine graminis* in Virginia and additions to the last host range. Plant Dis. Repr. 52:162-163.